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SCIENCE & TECHNOLOGY POLICY

Austrian Participation in EU Research Programs

AU1409164394 Vienna DIE PRESSE in German 14 Sep 94 p 19

["eid"-attributed report: "Austria To Participate in EU Research"]

[Text]Austrian companies and scientists now have an opportunity to receive support from Brussels funds for research projects for the first time. Tomorrow, the EU [European Union] Commission will put out to tender the first two specific programs that are part of the fourth framework program for research and development, in which Austria, by virtue of its membership of the European Economic Zone, can participate as an equal.

The total finance of the framework program, which runs for four years, amounts to approximately 170 billion schillings: About 22 billion schillings are available for the programs' industrial and materials technology, as well as communications technology and services. The aim of the EU research is not only to strengthen the European economy through increased technology transfers, but also to improve the quality of life.

For Austrian companies, participation not only means integration in the European innovation zone, but also partnership for marketing and sales, as well as entry to new markets, said section chief Raoul Kneucker, president of the Bureau for International Research and Technology (BIT), yesterday.

The European Union finances up to 50 percent of project costs. Kneucker cannot estimate how much Austria will receive because it depends on the number of forms of participation. Under the third EU framework program—despite more difficult conditions for participation—Austria is involved in 170 projects worth 600 million schillings. "It is our goal to double the number of projects in the first year," said BIT Executive Manager Manfred Horvat.

The BIT, which supports companies and scientists with advice and information—the deadline is 15 March—also wants to "awaken" researchers and firms whose potential has been slumbering until now. Thus, in cooperation with Wifi [Economic Promotion Institute], a poll has been started among small and medium-sized companies to gauge their interest in the special "Craft" part of the materials technology program. So far, 500 responses have been received.

EU Official on Role of Small, Medium-Size Enterprises

BR2608123294 Brussels IRDAC NEWS in English Summer 1994 p 2

[Article by Heinrich Von Moltke, director of the European Commission Directorate General XXIII for Enterprise Policy, Distributive Trades, Tourism and Cooperatives: "SMEs The New Motor of Europe's Economy"]

[Text]Small and medium-sized enterprises have a vital role to play in building the competitiveness of tomorrow's European industrial landscape. In this article, written specially for IRDAC News, Heinrich Von Moltke, Director General of DG XXIII (Enterprise Policy, Distributive Trades, Tourism and Cooperatives) offers his thoughts on the importance of SMEs to European research and industrial innovation.

Contrary to common perception the small and medium-sized enterprise (SME) is no longer a second or third-level sub-contractor supplying low-value products or services to bigger industrial companies. In many ways, today's SME is the motor of Europe's changing economy as very often they generate new technologies and products, driving Europe towards new technological leaderships.

SMEs also play a special role in ensuring that today's advanced economies function smoothly. The activities of SMEs are not peripheral to the activities of large firms, but central to the business trends which have emerged over the past decade, such as Just-in-Time supply, Design-in practices, decentralized manufacturing and distribution, and global/local marketing practices.

In our rapidly changing economy, many higher-level business services, such as consulting, engineering, marketing and legal services are provided by SMEs. Sub-contractors (50 percent of all SMEs are primarily sub-contractors) play an essential role in many industries, as firms focus their core activities and buy-in an increasing share of sophisticated parts and services. And increasingly, these specialist firms are SMEs.

Other services offered by SMEs include assembly to support large firms up-stream—in sectors such as plastics, textiles and clothing. Distribution, logistics and road transportation are other sectors where smaller players provide a key economic link for intra- EU [European Union] trade.

The SME Need is Market Driven

The increasing need for SMEs in our economy has been driven entirely by the market. Ever greater levels of complexity have been created by coordination requirements, technical sophistication and the need for global reach combined with local delivery. Here, SMEs help larger organizations balance the difficult requirement of remaining cost effective, flexible and ensuring global reach.

According to an American study which also applies to the European Union, industrial SMEs realize two-times more innovations per employee and generate three-and-a-half more new products per dollar invested in research than large companies. SMEs complement the activities of larger industrial companies, rather than replacing them.

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Some characteristics which contribute to this situation are:

- Flexibility
- Innovation
- Customer Orientation
- Low Overhead Costs
- Speed to Market

This impressive list of SME qualities must also be balanced against certain weaknesses in the areas of:

- Information
- Finance
- Management

The main pressure on small businesses today comes from two areas—regulatory pressures by public authorities, and business pressure on SMEs that are suppliers. For example, sub-contractors are frequently faced with the parallel requirement of introducing Just- in-Time, Total Quality Management, a high level of environmental protection and concurrent engineering to maintain their contracts with current clients. These combined conditions require major new investments and demands on management which small businesses are often ill-equipped to support.

SMEs and the Fourth Framework Programme

The Fourth Framework Programme can be instrumental in helping SMEs to become industrial innovators. It can help technology- oriented SMEs to capture a share of the European market and create their own international networks. Through its dissemination of research results, the Fourth Framework Programme can help a broad base of small firms to become more competitive. I am pleased to see that the Fourth Framework Programme will incorporate new mechanisms that will give SMEs better access to Community research. Above all, the extension of the CRAFT [Cooperative Research Action for Technology] and Feasibility Awards concepts to research areas outside BRITE/EURAM [Basic Research in Industrial Technologies for Europe/European Research on Advanced Materials] is a good starting point. If we are to improve the competitiveness of our SMEs by enabling better integration of SMEs in European Union research activities, the following steps must be taken which are largely foreseen in Framework Programme IV.

Promote Research Mobility for SMEs

The Human Capital and Mobility programme will pay more attention to the needs of industry - especially SMEs - by providing grants for the mobility of researchers and engineers from universities, research centres and large companies to SMEs. As we all know, IRDAC advocates this position.

Identify and Encourage "High Potential" SMEs

The specific research programmes will also play a major role in identifying fast-growing SMEs and encouraging networking among those firms, and with other interested research parties. The establishment of pan-European networks and the cooperation mechanisms they will create among user SMEs will enable the participating firms to compete successfully with the best of the large corporations (the report on the "Information Society" produced by Commissioner Bangemann's group outlined the importance of maximising the effect and usability of Information Technology for SMEs via trans-European networks).

Extend Craft to Traditional Industries

The CRAFT programme will receive more funding to increase the competitiveness of more traditional industries. Its concept will be extended to research areas like agro-industrial research where it is appropriate.

Focus on Patent Search and Technological Forecast

The efforts put in the diffusion and exploitation of EC research results will be extended beyond services offered to contractors once their project is completed to include services such as patent search or technological outlook proposed to SMEs at the feasibility stage of their research proposals.

Diffuse Existing Technology to SMEs

Much greater efforts/needed to be made to diffuse existing technology to SMEs, for example through a network of manufacturing technology centres on the lines of those currently being set up in the United States and already established in Denmark.

The Enterprise Policy Pluriannual Programme

Under the 1993-1996 pluriannual programme of the Enterprise Policy we are attempting first to ensure that the burden placed on small businesses from new regulations is minimized through impact assessment and cost effectiveness analysis, and by easing the burden of existing regulations where possible.

We are also attempting to improve the financial environment under which firms operate by creating seed capital funds for business start-ups, by exploring the feasibility of a European over-the-counter market for shares in SMEs, and by encouraging the introduction of loan guarantee schemes.

We are working to improve information through our Euro Info Centres, to improve the understanding of the management requirements of SMEs through our innovatory audits of various aspects of SMEs under the successive Euro-Management pilot schemes for the internal market, R&D and quality certification.

The newly adopted Integrated Programme for SMEs is giving substance to the objectives identified in the Commission's "White Paper on Growth, Competitiveness and Employment" by mobilizing the contributions of both the member states and the Commission.

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In conclusion, I would like to stress the importance of the role played by IRDAC [Industrial R&D Advisory Committee] over the years. IRDAC has enabled the Commission to closely examine the aims of EC research, including SMEs. We also thank IRDAC for encouraging initiatives such as CRAFT, which have been proved as successful, and are now expanding into other areas of EC research.

EU Research Council Approves Industrial, Communications Technology Programs

BR2608135694 Luxembourg I AND T MAGAZINE NEWS REVIEW in English Summer 94 p 3

[Unattributed article: "Council Adopts Specific Programmes on Industrial and Materials Technologies and Communication Technologies"]

[Text] A meeting of the European Research Council took place on 27 June 1994 in Luxembourg, under the Presidency of Mr. Constantin Simitis, Greek Minister for Industry, Energy and Technology.

Two Specific Programmes Agreed

The Council agreed on Decisions for the specific programmes on Industrial and Materials Technologies and Communication Technologies.

These are the first of 20 specific programmes to be agreed by the Council for the implementation of the Fourth Framework Programme and the Euratom Framework Programme (1994-1998). In order to implement these two programmes, the European Commission will be assisted by a committee composed of representatives of the Member States.

Formal adoption of the Decisions will take place after the finalization of the texts.

Financial Breakdown of the Specific Programme of Industrial and Materials Technologies

- Production Technologies:36.5 percent
- Materials and Technologies for Product Innovation:35 percent
- Transport Technologies:28.5 percent
- Total:ECU1,617 million.

Financial Breakdown of the Specific Programme on Communications Technologies

- Interactive Multimedia Services:ECU162 million
- Photonic Technologies:ECU104 million
- High-Speed Networks:ECU75 million
- Mobility and Personal Communications Networks:ECU115 million
- Network Intelligence and Ingenuity of Services:ECU100 million
- Quality, Safety and Reliability of Services and Communications Systems:ECU43 million
- Horizontal Actions:ECU31 million
- Total:ECU630 million

The Council Also Agreed on Three Common Positions:

1. A Decision on rules of participation for enterprises, research centres and universities in Community-specific programmes on research, technological development and demonstration;
2. A Decision on rules for the dissemination of research results of Community-specific programmes on research, technological development and demonstration.
3. A Decision on the rules of participation for enterprises, research centres and universities in the EAEC [European Atomic Energy Community]-specific programmes on research and education.

The above three Decisions aim to establish horizontal rules for the implementation of all Community-specific programmes on research, technological development and demonstration. Particular attention will be paid to small and medium-sized enterprises and to cooperation with third countries or international organisations.

These common positions will be formally adopted at a future Council session, after finalization of the texts. They will then be sent to Parliament in accordance with the cooperation procedure.

Cooperating With Third Countries

Regarding other matters, the Council took note of the Commission's proposal for negotiating Directives for a scientific and technical cooperation agreement with Switzerland. The Council will discuss the proposed scientific and technical cooperation agreement with Israel at a future Council session.

The Council agreed on a Decision on the conclusion of an agreement for scientific and technical cooperation between the European Community and Australia. Areas for cooperation were agreed as follows:

- Biotechnology;
- Medical and sanitary research;
- Marine science and technology;
- Environment;
- Information technologies;
- Communications technologies.

The Council approved two proposals for Decisions concerning relations between the European Community and the Republic of San Marino. In addition, the Council agreed on Decisions concerning the conclusion of two exchanges of letters modifying agreements between the European Community and Bulgaria and the European Community and Romania.

An exchange of views was held on the European Assembly of Science and Technology, launched by the Commission in March 1994.

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German Research Ministry Subsidizes R&D on Fullerenes

BR2408141594 Bonn TECHNOLOGIE-NACHRICHTEN MANAGEMENT-INFORMATIONEN in German 31 May 94 pp 7-8

[Text] Since August 1992 the BMFT [Federal Ministry of Research and Technology] has been subsidizing a 2 year pilot project with a total of 13 individual projects on fullerenes. The purpose of the sponsorship was to obtain basic findings on the production, and the chemical and physical properties of fullerenes, and a realistic assessment of the potential applications of this new class of materials in a field of research that is attracting much international attention, thus setting directions for more intensive research in the field in Germany.

Fullerenes are the third modification of elemental carbon alongside the familiar graphite and diamond. The fullerene molecules' three-dimensional closed cage structure with its many possibilities for chemical derivation has given rise to plenty of ideas about possible technical applications of fullerenes and their derivatives.

The findings obtained within the framework of the pilot project and the analysis of the international developments in this field of research in consultations with experts and in technical discussions have allowed a precise appraisal of the potential applications.

The second stage of the fullerene project sponsorship will therefore involve in-depth studies and application-oriented work mainly in the following areas:

A. Areas of research where the present state of knowledge shows a potential application:

- Use of fullerenes and their composites as catalysts for chemical reactions;
- Use of fullerenes and their composites to improve the artificial diamond manufacturing process;
- Use of fullerenes and their composites to simplify the production of thin diamond coatings for microelectronics applications and antiabrasion coats;
- Use of fullerenes and their composites to produce functional polymers with novel properties;
- Investigating the use of fullerenes as components for the synthesis of highly stereoselective systems.

B. Areas of research where the present state of knowledge is insufficient to assess potential applications:

- Investigation of higher fullerenes Cn with greater than 70;
- Production and characterization of endohedral fullerenes;
- Investigations of carbon nanotubes and onion structures;
- Investigations of the composition and possible use of the fullerene black produced in the arc process.

Subsidies are granted for basic research in public research institutes and industrial concerns which carries a high scientific or technical risk and is highly complex and multidisciplinary.

Undertaking projects as international cooperative research is expressly welcomed.

The BMFT supports research projects on the basis of the budget resources available. The maximum contribution for industrial basic research projects is 50 percent of the project's gross cost. For projects in small- and medium-sized firms (SME) and for companies in the new laender an additional 10 percentage points may be granted which, if the Commission of the European Community agrees, may be accumulated to a maximum supplement of 15 percentage points. Up to 100 percent of the expenditure may be paid for basic research projects in public research institutes. The BMFT's respective control principles are applied. There is no legal entitlement to funding.

Proposals for research projects, initially in the form of a brief description, must reach the prime contractor VDI [Federation of German Engineers] Technology Center, Physical Technologies, P.O. Box 101139, W-40002 Dusseldorf by 17 June 1994. Applications received after that date may be considered in a second round provided they are received by 31 July 1994. The brief description must be set out as follows:

- Subject and overall goal of the project;
- Scientific and technical objectives;
- Prospects of success;
- State of the science and technology, literature references;
- Own existing work and own infrastructure;
- How the proposed project will be approached;
- Work plan and timetable with milestones, load chart;
- National and international cooperation partners;
- Costs and expenditure for personnel, investments, materials, total and per calendar year.

The brief description must not be longer than 10 pages in all.

Project proposals will be submitted to a team of experts, including international experts, who will evaluate them and select projects. Applicants will be notified of the outcome of the appraisal.

Further information and advice on sponsorship may be obtained from the prime contractor VDI Technology Center (see above). The contact there is Dr. Peter Haertwich, tel. 0211/6214-304, Fax: 0211/6214-484.

German Research Minister Interviewed

BR2908143294 Bonn BMFT-JOURNAL in German Jun 94 pp 3,22

[Interview with Federal Research Minister Dr. Krueger by BMFT-JOURNAL:"There Must Be a Marked Improvement in the Framework Conditions for Research;" date and place not given]

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[Text] [BMFT JOURNAL]: The current state of the Federal budget has required a number of economy measures. The BMFT [Federal Ministry of Research and Technology] has not been spared. Can you still fulfill your extensive remit with your reduced budget? [Dr. Krueger]: In 1994 the BMFT accepted cuts of 250 million German marks [DM]. These are offset by, among other thing, DM150 million from the assets of the PDS [Party of Democratic Socialism] that I was additionally able to secure for industrial research in the new laender

When evaluating the BMFT budget one must not forget that as a proportion of gross domestic product German government's contribution to promoting civil research and development is nearly twice as high as in world innovation champions USA and Japan. The government's share of total research and development expenditure—that is, expenditure by the government and by firms has risen steadily since 1989: The growth in science expenditure in the new laender has contributed significantly to this. It is also paid indirectly out of federal funds.

But this is not enough: Our country's assets are intelligence and creativity. I am therefore doing what I can to get the BMFT budget suitably increased in 1995.

I am also trying to get tax concessions for research and development in industry; this would create considerable financial scope for research. The efficiency of tax incentives for research and development is not undisputed. But we have devised convincing arguments for such support: international comparison clearly shows that tax incentives for R&D are effective. They can be a particular incentive for expanding a company's R&D personnel. I, therefore have the support of all the major industrial associations in seeking tax incentives for R&D. The federal government will decide about it in its overall taxation plan in June.

[BMFT JOURNAL]: What non-monetary action can also be taken?

[Dr. Krueger]: First, we must examine the legal and social environment for research and development for unnecessary obstacles and if necessary take steps to remove them. The amendment to the genetic engineering law is one example. But improvements are also urgently required to the chemicals law, the animal welfare law, patent law, and the often rightly complained of immobility in public service law and administrative procedures. For this reason, I have set up a special unit in the BMFT to deal with the legal framework conditions for research and technology.

But I also see cause for concern in the attitude of some groups in society to the results and consequences of research and technology. If a critical position turns into pure obstructiveness, as it did in the debate about the Transrapid decision, there is a danger that the unwillingness to take risks will itself become a risk to society. The "Days of Research" in June may make an important contribution here to an objective discussion. Only if we discuss the risks and also the opportunities of new, modern technologies openly and objectively will we win the future. I am placing a lot of hope in this joint action by science, industry and politics.

[BMFT JOURNAL]: These actions and measures are more concerned with the initial conditions for research and development. But how are things when it comes to directly translating research findings into practice?

[Dr. Krueger]: It is true that at present the transfer of findings and the exchange of experts between science and industry is inadequate. In the last few years there has been a steady drop in demand from industry for the latest research findings. But science, too, has often failed to take its findings to industry. There is still a lot to be done here. I have taken a number of measures to improve the dialog between these groups. For example the Research Cooperation Program and the Innovation Courses in the new laender. I have also brought experts from science and industry round my table in the strategy circle to identify the barriers and propose specific remedial action. I am expecting its first report before the summer break.

The Federal Chancellor will also be setting up a Council for Research, Innovation and Technology, whose members will discuss interdisciplinary and intersectoral matters affecting research and innovation in Germany. The BMFT will be managing this committee.

[BMFT JOURNAL]: In the last few months there has been a sometimes dramatic increase in the number of unemployed scientists. How is your proposed exchange of experts between research and industry to operate if scientists cannot find jobs in industry anymore?

[Dr. Krueger]: Raising a new generation of highly motivated scientists is one of the most important steps in ensuring that Germany remains a country of research and innovation. Every mark invested here is a mark for the future, with a promise of a high return. For this reason I have urged the introduction of a practical year for postdoctoral researchers. I envisage young scientists moving to industry, for example in the third year of their appointment to a research institute, in order to gain practical experience there. I will also make funding available for this. As the economy begins to recover, companies' research and development departments will urgently need this mixture of scientific training and practicality. I know that this idea has been well received in various sectors of industry. The first young scientists will transfer to industry in July this year.

[BMFT JOURNAL]: Research is getting more and more expensive and increasingly time-consuming. Will large international concerns be the only ones who can afford their own research and development departments in the future?

[Dr. Krueger]: Most certainly not. Small and medium-sized firms have always been and always will be the

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driving force of innovation in Germany. Every product innovation, especially in the high-tech range, will always be rooted there. But we must give them back the necessary freedom of action to continue and intensify their research and development. We must clear the obstacles from their path in the field of tax incentives for R&D expenditure and in the availability of risk capital, and by helping with the foundation of firms. We are currently engaged in talks with the federal Finance Ministry about this.

[BMFT JOURNAL]: Germany is still among the world's leaders when it comes to basic research. But why have we missed the boat when it comes to securing big technology markets?

[Dr. Krueger]: We haven't missed the boat at all when it comes to securing high technology markets. There are a number of reasons for the loss of market position in some fields. Certainly, industry's loss of commitment to high-tech research has something to do with it. In the last few years an increasing proportion of industry's research and development expenditure has gone to those areas where Germany traditionally had a good world market position: Mechanical and plant engineering, automotive and aircraft engineering. Fewer and fewer genuine high-tech innovations were developed and converted into marketable products.

What we need is a faster transition from findings to products that can hold their own on the market. This requires improved cooperation between research and industry. As the minister responsible, I am setting this dialog in motion. For this reason, the "Days of Innovation" are being coordinated with industry's "Initiative To Improve the Climate for Innovation." For the first time we are canvassing for more open-mindedness among the public.

ESA Initiative Aids Technology Transfer

BR2908080494 Berlin NTZ in German Jun 94 pp 445-446

[Text] Using know-how from a different field offers not only great potential for innovation but also many opportunities to reduce costs. But adequate information or the broad coordination necessary for a successful technology transfer are often lacking.

Looking for Suitable Partners

The European Space Agency ESA's Technology Transfer Initiative assists firms in identifying and evaluating potentially transferable technologies developed in their own or in ESA research programs. This assistance is made available on a practical level by Spacelink Europe, a consortium of "technology brokers" from Germany (MST Aerospace in Cologne), England, France, and Italy. It offers 60 aerospace technologies from various fields, including optics, sensors, communications, biosciences, medicine, and robotics. Spacelink Europe uses a network of brokers in nearly all states contributing to ESA to find partners to exploit these technologies. In the three years of existence it has arranged more than 260 mainly international contacts. The transfer methods are not confined solely to licensing. For example, those acquiring the technology are interested in joint developments for applications outside of aerospace; this enables aerospace companies to expand their product range.

Aerospace "Spin-Off"

One example of successful transfer is the Topsim simulation program for communications systems design and analysis. A graphic input interface allows developers to concentrate on system design without having to consider programming constraints. The constantly expanding library contains many different system blocks and the particularly important evaluation procedure. The program is currently used in telecommunications in over 60 laboratories in Japan, the USA, most of Europe, and elsewhere.

Aerospace also makes particular demands on electronic equipment. The Danish firm Alcatel Kirk gained extensive experience in the development of robust, light, and reliable power electronics. It was therefore possible also to use these technologies in advanced energy systems for fly-by-wire control systems in commercial aircraft such as the Airbus 320. Alcatel Kirk has supplied mains-independent energy systems, designed for low temperatures and for discontinuous and reliable operation in satellites, to polar observatories in Greenland.

The physical stresses during a space mission require high accuracy of positioning—in the nanometer range—for such components as antennas, mirrors, or sensors. In making such developments the British firm Queensgate acquired considerable know- how in the use of piezoelectric actuators and displacement sensors. Piezoelectric components are particularly suitable for aerospace applications, since they combine high output power and dynamic capacity with low weight and low power consumption. An example is the ESA Silex project, where satellites communicate by laser. The highly critical beam control mechanism, needed to compensate for the relative motion of the satellites, was developed by Queensgate. A similar system will in future be used to create luminescence variations in the so-called Soho mission. Here these components are used to center the sun's image very accurately on a silicon detector. This technology also has great potential for use in industry. Similar sensors can be used to measure capacitive shifts in many Earth-bound applications, including microscopy, instrument controls for precision machine tools, interferometers, conventional beam steerers, measuring structural deformation in precision mechanical structures, and force and movement sensors for robot arms.

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Germany:Max-Planck Institutes in New Laender Profiled

MI1209083294 Munich MPG SPIEGEL in German 3 Jun 94 pp 44-51

[Text] The Max Planck Society [MPG] funds basic research of supraregional significance in particularly forward-looking fields. Development in research fields holding out particular international promise is the foundation for the regular metamorphosis of its existing institutes and the establishment of entirely new ones. Research organizations in nearly all the industrialized countries are currently seeking to forecast possible development trends and needs in the light of the present stage reached in research in the various disciplines.

It is generally agreed that many life and natural science disciplines worldwide are caught up in developments that are moving far faster than anyone could have foreseen 10 or 20 years ago.

There are several reasons for this, each carrying a different weight in the various disciplines:

- The introduction of new working methods (such as image-generating analysis methods with atomic resolution;
- The availability of large computing capacities for modeling and simulation across the whole board of theoretical and experimental disciplines;
- The increasing overlapping of areas in various disciplines;
- The rapid spread of new findings (via the latest communication media and a growing number of international technical journals);
- The expansion of joint international research.

Then there is also the constant stream of creative, motivated young scientists and, last but not least, tougher economic competition between the industrialized countries and the fastest possible conversion of research findings into competitive products. This has also led to an increase in feedback between research, the application of its results, and the new issues that arise out of it.

Meanwhile, European integration, the transformation of eastern Europe, the emergence of nationalist and fundamentalist movements, and technological and ecological change all pose challenges to the humanities and social sciences that make demands on their whole range of methods and content.

The Max Planck Society examines these national and international findings and adds its own observations, analyses, and trend assessments. It then uses them as the basis for its deliberations as to the fields in which the founding of new Max Planck institutes might be of particular urgency. The consultation, foundation, and building process for new research institutes is a complex and time-consuming one, as it acquires the significance entailed in the founding of permanent research facilities and the long-term commitment of top international scientists and extensive resources. As a rule, newly founded institutes initially have to be housed in temporary accommodation until they can more into their new, purpose-built premises (after about three to five years).

The Max Planck Society has founded new institutes in the following disciplines since 1992.

I. Natural Sciences:Solid-State Physics

More than half of all physicists are currently engaged on research into the properties of condensed matter, their field, solid-state physics, comprising a wide range of topics. One example of the latest solid-state research is the interplay between basic research and materials research and production. It is precisely because of this research field's relevance to solving fundamental questions and to production processes for new materials that solid-state research continues to be of outstanding importance. This is further underlined by the awarding of the Nobel prize for the quantum Hall effect, tunnel and electron microscopy, high-temperature superconductivity, and, last but not least, polymer research over the last few years.

New, pioneering approaches and concepts have emerged in solid-state physics primarily where interdiciplinary joint research has been brought about with other branches of the natural sciences, such as chemistry, materials science, and applied mathematics. It is precisely at such an interface that the Max Planck Society founded another solid-state research institute in November 1992, the MPI [Max Planck Institute] of Microstructure Physics in Halle/Saale.

Microstructure and microcoating topics concerning particular classes of substance and phenomena were already being studied at existing Max Planck institutes and the national research facilities. The research strategy for the new institute is based on Science Council recommendations on the former GDR [German Democratic Republic] Academy of Sciences Institute of Solid-State Physics and Electron Microscopy and on ideas developed within the Max Planck Society. The brief of the new institute will be, firstly, to arrive at a better understanding of the correlation between the structure and specific properties of the systems and/or substances studied and, secondly, to devise ways of producing extremely small structures for specific purposes. The research will center around such promising topics as wafer bonding, smart materials, luminescent silicon, faults in semiconductors, the interface microstructure and chemistry of ceramic composite systems, and thin-film magnetism.

Advances in this field of basic research are expected to have far-reaching implications for many areas of application ranging from microelectronics through magnetic information storage to ecological problem solving.

Chemistry

There is an increasingly marked trend in chemistry toward the inclusion of more physical test methods and

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theoretical models and toward the closer integration of chemical and physical methods (analysis, synthesis, and description), which is making for an increasingly quantitative and atomic understanding of chemical processes.

To this end, the Max Planck Society has founded an Institute of Colloid and Interface Research, absorbing the scientific capability on hand at former Academy of Sciences institutes. Pending construction of a new laboratory building in Golm, near Potsdam, the institute has its headquarters in Teltow. Colloid and interface research is a highly diversified, interdisciplinary research field that is in the process of expansion throughout the world. It requires close, indeed physically close, scientific cooperation between theorists and experimenters. The Federal Republic of Germany is lagging behind in research in this field—which is established at the universities with only a few teams, whereas other countries have strong centers. Even in terms of the practical relevance of colloid research to industry (use of tensides and polymers), basic research fails to provide an adequate response.

The institute focuses on aspects of the chemistry and physics of surfactants and particle-particle interactions and on research into colloidal substance classes, such as polyelectrolytes and polymer dispersions, which both pose questions for basic research and are of great practical significance for the solution of environmental problems in industry and water economy.

Nonlinear Dynamics

Nonlinear dynamics is a field that has been undergoing rapid development for over 10 years, during which the discovery of the dynamics of complex systems has been of fundamental scientific importance, enabling strict laws and causalities to be reconciled with unpredictability and chaos, and showing that long-term developments are unpredictable not in spite of, but precisely because of, this (nonlinear) law.

The natural science disciplines have also been brought closer together by the astonishing universality of the laws of nonlinear dynamics and their wide-ranging applicability.

It is true that a remarkably large number of theoretical and experimental physicists are already working on nonlinear dynamics in Germany and have made decisive contributions to advances in this field. However, unlike the United States—which has centers in Stanford, Los Alamos, San Diego, Austin, Atlanta, and Urbana—Germany has no one research facility where all the teams engaged in this field can work directly together, thus doing justice to the interdisciplinary and innovative nature of the physics of complex systems. By way of contrast, research centers with a similar brief are coming into being in other European countries (one being in Nice).

The Max Planck Society decided in 1992 to set up an Institute of the Physics of Complex Systems in Dresden. This is a pivotal and extremely innovative area of theoretical physics, requiring close interdisciplinary and interinstitutional cooperation. The strategy behind the Max Planck Institute of the Physics of Complex Systems fosters effective cooperation with special research programs on related topics, other university teams, and research centers focusing on related subjects in other countries. This gives it the opportunity to develop into a European nucleus around which research on complex systems can crystallize, work with a number of eminent scientists from the eastern European countries being expressly envisaged.

The results of research in this field have enormous practical relevance in addition to their purely scientific implications. Major areas of application are hydro- and aerodynamics, the chemistry of complex reactions, biomolecular physics, optoelectronics, electronic and optical data processing, solid-state physics, and materials research.

II. Life Sciences/Medicine

Biological and medical research is marked on the one hand by the adoption of physics, chemical, and, increasingly, mathematical findings, approaches, methods, and (test) instruments: The new and still growing opportunities for describing and understanding details of the structure of living organisms and their functions with higher and higher spatial and temporal resolution are opening up new branches of specialization. On the other hand, the wealth of data and findings obtained means that new approaches providing an overall understanding and an integrated overview of large interrelated areas are needed, not least so that organisms and whole habitats can be treated for preventive or therapeutic purposes.

The Max Planck institutes of the Biology of Infection, of Molecular Plant Biology, and of Neuropsychology Research are at the center of this dialectic stress ratio between two views, one tending to the atomistic and one to the overall, of nature and life.

Biology of Infection

The resurgence of infectious diseases long considered eradicated and the emergence of hitherto unknown syndromes pose new medical and health policy challenges. Research into the complex biological phenomenon of infection is both a demanding and a pioneering area on the borderline between basic biological and clinical research. In view of the rapid advances achieved in the development of the fundamental disciplines involved, such as molecular biology, cytobiology, and immunology, it would appear possible to arrive at a better understanding of the biology of the infection process and, consequently, at new approaches to the prevention and treatment of infectious diseases.

The Max Planck Society decided in 1992 to found an Institute of the Biology of Infection in Berlin to devote the requisite attention to this area, which is of importance both to basic research and to medical practice. The

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institute's research work sets out to launch a multidisciplinary assault on the problems inherent in the biology of infection: The approaches and research methods applied in molecular genetics, immune biology, cytobiology, epidemiology, clinical research, and structural chemistry will be used to introduce innovative strategies and trailblazing lines of research into the biology of infection in Germany. Indeed, although this area is enjoying a boost worldwide, with a few exceptions it has hardly reached an internationally competitive level to date in Germany.

By founding a Max Planck Institute of the Biology of Infection, the MPG has taken a decisive step to get this pioneering subject established in both basic research and medicine to a degree commensurate with its importance, thus fulfilling its vanguard role as the promoter of new, hitherto unrepresented lines of research. The institute will work closely with university departments and clinics from the outset so as to arouse and deepen their interest in this discipline, thus creating job opportunities for the scientists trained at the institute.

It is a planned priority to integrate clinical research into the institute's approach and to recruit clinicians working with infectious diseases to research teams. Research programs addressing infectious diseases in Third World countries will also be drawn up and carried out either jointly with locally established research laboratories or by setting up field stations on the spot.

The new Max Planck institute will be established in the Charite grounds, close to the German Rheumatism Research Center. This arrangement will also foster projects on the presumed connection between human infectious and autoimmune diseases, another topic of medical importance on which the institute will focus. It may be expected that, in the longer term, the institute's research findings will make new contributions to the effective fight against infectious diseases.

Molecular Plant Physiology

Plant physiology is one of the classic subdivisions of biology. It sets out to understand the metabolism, growth, development, and stimulus perception and transmission of plants and to subject them to causal analysis. The emergence of new molecular biology techniques and the use of nondestructive physical and biochemical testing and analysis procedures now make it possible to answer these questions, some of which date back a very long way. This has already been accomplished very successfully in Germany as regards photosynthesis (1988 Nobel prize). In the light of the ground that needed to be made up on many other plant physiology topics, the Max Planck Society decided in 1992 to found an Institute of Molecular Plant Physiology in Golm, near Potsdam.

The institute's terms of reference will be to investigate the processes of biosynthesis, the distribution, transfer, and storage of low-molecular substances and high-molecular constituents [Inhaltsstoffe] with storage, structural, or signal functions. An integrated approach incorporating biochemical, plant physiology, and molecular genetic techniques will be adopted, the goal being to create system-oriented plant biochemistry and physiology. The work will comprise the application and refinement of modern physical and biochemical analysis methods for use on living plants with a view to answering plant-specific questions. Combining these methods creates a new approach to solving plant physiology problems. From the science policy point of view, it is also significant that plant physiology and biochemistry are firmly rooted in the new federal laender. The unification of the two Germanies thus provides a unique opportunity for breathing new life into this tradition.

It is expected that, in the long term, the institute will be able to make a significant contribution to basic research and will also foster the growth of a new subdiscipline, that of molecular plant physiology. As this is one of the first institutes of its kind in the world, it ought to attract young scientists, and it will help maintain and consolidate Germany's good position in this rapidly developing area with respect to highly active teams in other countries. Last but not least, the work envisaged is likely to have a considerable impact on applications involving the exploitation of plants as sources of food and raw materials or for the extraction of constituents

Neurosciences

Of all scientific disciplines, the neurosciences show the highest growth potential in the nineties. Research worldwide is turning rapidly to the nervous system, and the nineties have thus been declared the "decade of the brain." The integration of broad sections of traditional subject areas into neurobiology is creating new subdisciplines, and both reductionistic and integrative approaches are being further developed in the process

The Max Planck Society founded an Institute of Neuropsychology Research in Leipzig in 1993 to study the neurosciences.

Neuropsychology is a still young discipline, although it is already well established on an international level, occupying the area where neuroscience overlaps with behavioral science. It endeavors to find out which psychologically describable tasks are performed in the brain by which structures and in what form. The planned institute will be working at the interface between clinical neuropsychology and experimental cognition psychology, investigating links between pathological changes in the brain—such as those caused by cerebral thrombosis, brain tumors, or accidental injuries—and the associated changes in behavior and experience. This field has received a particular boost from two recent developments: In the first place, the scope of neurology has acquired a new dimension with the development of modern invasive [as published], high-resolution brain imaging processes (CT [computer tomography], MRT,

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and PET [expansions not provided]). These processes make it possible not only to locate brain injuries with much greater precision but also to trace the activities of selected brain structures in the waking state and simultaneously with the performance of particular actions. Secondly, clinical neuropsychology and experimental cognition psychology have recently grown much closer together under the concept of "cognitive neuropsychology," as a result of which the two branches have stimulated one another to a remarkable degree and a marked improvement has been achieved in the identification and description of the psychological correlates of the pathological processes that take place in the brain.

In the light of these technical and theoretical developments, neuropsychological research may be regarded as having an extraordinarily high innovation potential. It must also be said that the recent development of neuropsychology has so far largely passed Germany by. The main reason for this loss of ground probably lies in the fact that the disciplines embracing neuropsychology—psychology and neurology/neurobiology—are traditionally assigned to different faculties at German universities and are thus kept separate at the institutional level. This chasm will now be bridged by an interdisciplinary Max Planck institute.

A particular feature of the founding of this institute is that it requires facilities for institutionalized cooperation with a university to an extent that has not to date been the norm for Max Planck institutes. It is only by working closely with a faculty of medicine with an efficient clinical facility that the institute can ensure access to a sufficient number of chronically brain-damaged patients to be able to work successfully. In the same way, it needs to be able to work with a department of psychology covering a wide range of disciplines and open to neurobiological issues.

III. Humanities and Social Sciences:Economics

The accomplishment of German unity, the latest steps in western European integration, and the transformation of the economic systems in eastern Europe represent major incentives and challenges to economic research that it must address by deploying, while at the same time critically reviewing, its whole arsenal of methods. Numerous fields of national economy research are affected, added to which solving the problems associated with these processes requires the development of new action strategies supported by research.

Economic research had previously concerned itself mainly with the processes that occur within given economic systems and with the comparative study of those systems, not with changes in economic orders pursued to the extreme of transformation. The institutional framework surrounding economic phenomena and its modification has consequently been analyzed by only a very few economists. The transformation of the socialist systems revealed a glaring scientific gap. The same applies to the widespread disregard for the significance of knowledge for work-sharing economies, which, among other things, led to socialist systems still passing a few decades ago for organizations whose problems could apparently be solved solely in economic terms. Here too, there were just a few isolated researchers who, decade after decade, stressed how the knowledge problem was being neglected in assessments of the organizability of socialist economic systems. Just how much these systems, precisely as a result of their necessarily uneconomic organization, lived on their assets to the point of outright ecological rape is only now emerging to the full. With regard to the knowledge and institution problem there is a lot of ground to be made up, and not only in Germany, in basic economic research, the results of which will then be able to provide a basis for possible economic policy measures.

With these topics in mind, the Max Planck Society decided in 1992 to found an Institute of Research into Economic Systems headquartered in Jena. Founding this institute is a matter of particular urgency because, among other reasons, the study of economics in the new federal laender needs to be rebuilt from scratch, and the institute could constitute a nucleus around which it could crystallize.

The scientific strategy for the institute envisages a combination of approaches embracing economic order and process theory, economic policy theory, and system comparison. Topics arising out of present-day experience, on which the transformation and economic reordering of the whole of Europe have a decisive bearing, and the present research backlog to be made up ensure that the institute will have both current and lasting relevance.

History of Science

Over recent decades, the history of science has seen a considerable broadening of its terms of reference, methods, and objectives. Handled merely as the historiography of individual scientific disciplines or institutions, it can no longer meet the demands made on it by society. It must focus more strongly on the question of the historical conditions that determine the potential of science and its limitations. In view of the significance of science history research for science in the future, the university and institutional facilities available to it in Germany, even since unification, are inadequate, in spite of the fact that the teaching of the history of science and technology is now better rooted in the universities in the new laender than in those of the original federal laender.

The Max Planck Society decided in 1993 to found an Institute of the History of Science in Berlin.

The institute is being founded to establish a theory-oriented history of science, i.e., a history of science oriented toward systematic inquiry and taught from the theoretical point of view, that will study the processes by which knowledge is acquired and their interplay with the

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thinking and cultural influences prevailing in any given era. The institute's terms of reference will focus on the natural sciences, and the methods that it will employ will follow cognition and cultural studies lines. Interest will center on a comprehensive Historical Epistemology addressing the history of the fundamental cognitive processes involved in the acquisition of scientific knowledge and the development of conceptual categories, such as "experiment," "proof," "causality," and "objectivity," and doctrines, such as "determinism" and "probabilism" as reconstructed from science history sources. This concentration on comprehensive concepts makes for generalization and comparisons across subject boundaries. This also applies to source research in the narrower sense: Research into the processes by which scientific thinking has developed will also be complemented by new historical source documentation methods, for instance electronic archives on CD-ROM [compact disk read-only memory], so as to facilitate access to those sources—also across subject boundaries. The institute will thus contribute to the regaining of the considerable ground lost in science history research, which is currently undertaken in Germany on overwhelmingly monodisciplinary lines and inadequately represented at both the structural and institutional levels.

In order to stimulate science history research, the planned institute will work flexibly and openly with other research facilities in Germany and abroad. Close cooperation with universities, archives, libraries, and museums, the involvement of foreign guests, and the intensive nurturing of young scientists will combine to provide a stimulating influence on the scientific scene now developing in the new federal laender.

Max Planck Institutes in the New Laender

Status: 13 April 1994 Max Planck Institute of the Biology of Infection Jaegerstr. 10/11—10117 Berlin Scientific Member, Institute Director: Prof. Stefan H.E. Kaufmann Tel. 030/20192-130—Fax -120 Max Planck Institute of Colloid and Interface Research Kantstr. 55—14513 Teltow Managing Director: Prof. Helmuth Moehwald Scientific Members, Staff, Institute Directors: Professors Markus Antonietti, Reinhard Lipowsky, and Helmuth Moehwald Tel. 03328/462-16/17—Fax -15 Max Planck Institute of Microstructure Physics Weinberg 2—06120 Halle/Saale Managing Director: Prof. Johannes Heydenreich Scientific Members, Staff, Institute Directors: Professors Juergen Kirschner, Ulrich M. Goesele, and Johannes Heydenreich Tel. 0345/5582-50—Fax 0345/5511-223 Max Planck Institute of Molecular Plant Physiology c/o MPI of Molecular Genetics—Ihnestr. 73—14195 Berlin Scientific Member, Institute Director: Prof. Lothar Willmitzer Tel. 030/830007-61—Fax -95 Being founded: Max Planck Institute of Neuropsychology Research Apply to: Max Planck Society, General Institute Administration 4 P.O. Box 101062—80084 Munich Tel. 089/2108-2214 Max Planck Institute of the Physics of Complex Systems Bayreuther Str. 40, Building 16—00187 Dresden Scientific Member, Institute Director: Prof. Peter Fulde Tel. 0351/4637696 Max Planck Institute of Research into Economic Systems Sophienstr. 10—07743 Jena Scientific Member, Institute Director: Prof. Manfred E. Streit Tel. 03641/23526 or 55452—Fax 03641/55459 Max Planck Institute of the History of Science Wilhelmstr. 44—10117 Berlin Scientific Member, Institute Director: Prof. Juergen Renn Tel. 030/2293184

Germany:BMFT Outlines Future Manufacturing Strategies

MI0809100894 Bonn TECHNOLOGIE-NACHRICHTEN PROGRAMM-INFORMATIONEN in German 15 Jun 94 pp 2-12

[Text] **I.Introduction**

About one year ago, the BMFT [Federal Ministry of Research and Technology] launched a discussion and clarification process on the topic of "Strategies for Production in the 21st Century" with a view to identifying:

- trends in specific factors having a bearing on production for the future;
- objectives and visions of production in the future;
- problems and obstacles encountered in the creation of a competitive production environment;
- action needed on the part of industry, science, and the state. and
- recommendations for measures to be taken by the BMFT to support Germany as a production environment.

With this end in view, a broad-based discussion process has been held by a discussion panel in the light of a survey on "Strategies for Production in the 21st Century" conducted under the auspices of the Fraunhofer Society and directed personally by its chairman, Professor Warnecke. The experts engaged on this work are listed in Section II (Participants).

The concluding report on the survey will be published in approximately eight weeks. The BMFT measures already under way in this connection are described in Section III.The BMFT will launch initial priority measures without delay (Section IV).

A BMFT program entitled ""Production 2000" will be announced in 1995 following notification to the European Union.

II.Participants

Discussion Panel (A)

Joint Chairmen:

- Prof. Hartmut Waule, Daimler Benz AG board member and
- Dr.Werner Gries, BMFT departmental head.

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Members:

- Andreas Drinkuth, IG Metall [Metal Workers' Union];
- Bruno Fruend, graduate engineer, Siemens AG [joint-stock company];
- Horst Heinen, graduate engineer, managing director of Seppelfricke Bros. GmbH [limited] & Co. Steel Mills;
- Hubert Hess, Gesamtmetall;
- Hans Ulrich Jaissie, graduate engineer, managing director of Hueller Hille GmbH;
- Hans Klingel, deputy board chairman of Trumpf GmbH & Co.;
- Prof. Burkhart Lutz, Institute of Social Science Research;
- Dr. Eberhard Merz, Carl Freudenberg;
- Prof. Walter Michaeli, Institute of Plastics Processing, RWTH [Rhineland-Westphalia College of Technology], Aachen;
- Prof. Joachim Milberg, board member of BMW AG;
- Dr. Heinz Muno, German Mechanical and Plant Engineering Association;
- Prof. August-Wilhelm Scheer, Institute of Industrial Computer Science, Saarland University;
- Prof. D.Schmoeckel, Institute of Metal Working, TU [Technical University] of Darmstadt;
- Prof. Dieter Tischendorf, Chemnitz Technology Transfer Center;
- Prof. Hans Kurt Toenshoff, Institute of Production Engineering and Cutting Machine Tools, University of Hannover;
- Prof. Hans-Juergen Warnecke, chairman of Fraunhofer Society.

Working Parties (B)

Direction:Professor Warnecke, Fraunhofer Society

Coordination:Dr. Becker, Mr. Foerster, Fraunhofer Institute of Production Engineering and Automation (IPA), Stuttgart.

Working Party 1—Markets, People, Society

Chairman:Professor Lutz, Institute of Social Science Research (ISF), Munich

Members:

- Professor Biervert, Bergland University Polytechnic, Wuppertal;
- Dr. Dybowski, Federal Institute of Professional Training, Berlin;
- Mr. Gans, Fraunhofer Institute of Ergonomics and Organization, Stuttgart;
- Dr. Klauder, Labor Market and Employment Research, Nuernberg;
- Dr. Lay, Fraunhofer Institute of System Engineering and Innovation Research, Karlsruhe;
- Professor Mickler, Sociological Research Institute, Goettingen;
- Professor Reichwald, Department of Applied General and Industrial Economics, TU Munich;
- Mr. Schneider, Confederation of German Trades Unions, Federal Executive, Duesseldorf;
- Dr. Volkholz, Society for Industrial Health and Safety and Humanization Research, Dortmund, and
- Dr. Wilfert, Secretary of Federation of the Baden-Wuerttemberg Steel Industry, Stuttgart.

Working Party 2—Innovation and Creation of Knowledge

Chairmen:Professor Staudt and Dr. Kriegesmann, Institute of Applied Innovation Research (IAI), Bochum

Members:

- Mr. Bartel, Gesamtmetall Employers' Union, Cologne;
- Dr. Detzer, MAN [Augsburg-Nuernberg Machine Factory] AG;
- Professor Dierkes, Berlin Science Center;
- Mr. Freund, German Economy Rationalization Board, Frankfurt;
- Mr. Haase, VW [Volkswagen] AG;
- Dr. Hartlieb, German Standardization Institute, Berlin;
- Professor Heyse, German Industry C;
- Dr. Hirsch-Kreinsen, Institute of Social Science Research, Munich;
- Mr. Klotz, Metal Workers' Union, Frankfurt;
- Professor de Pay, Freiburg Academy of Mining;
- Mr. Sprengler, Dr. Josef Raabe Publishing Co. GmbH, Stuttgart;
- Professor Voll, Institute of Innovation Management, Leipzig, and
- Mr. Wengel, Fraunhofer Institute of System Engineering and Innovation Research, Karlsruhe.

Working Party 3—Products and Processes

Chairmen: Professor Toenshoff and Mr. Gloeckner, Institute of Manufacturing Engineering and Cutting Machine Tools (IFW), Hannover

Members:

- Professor Adam, Motor and Turbine Union (MTU), Munich;
- Mr. Baszenski, Gesamtmetall Employers' Association, Cologne;
- Mr. Diekmann, Gildemesiter AG, Bielefeld;
- Professor Eversheim and Dr. Lehmann, Machine Tool and Industrial Management Laboratory, RWTH, Aachen;
- Mr. Gassmann, Metal Workers' Union, Frankfurt;
- Dr. Haverbeck, Schindler Elevators, Berlin;
- Dr. Lemmer, Sennheiser Electronics KG, Wedermark;
- Professor Michaeli and Dr.Lessenich-Benkys, Institute of Plastics Processing, RWTH, Aaachen;
- Professor Milberg and Dr.Naber, Munich TU Institute of Machine Tools and Industrial Management Sciences, Augsburg User Center;
- Dr. Neumann; Preussag Ag, Hannover;
- Professor Spur and Dr.Berker, Fraunhofer Institute of Production Plant and Kom [as published];
- Professor Tischendorf, Chemnitz Technology Center;

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- Professor Weidemann and Mr.Strathmeier, P GmbH, Langen;
- Professor Weissner and Dr. Geisler, Volkswagen AG, Wolfsburg, and
- Professor Zuelch and Dr. Grobel, Institute of Ergonomics and Industrial Organization, University of Karlsruhe.

Working Party 4—Cyclic Economy

Chairmen: Professor Schubert and Dr. Ziegahn, Fraunhofer Institute of Chemical Technology (ICT), Prinztal

Members:

- Dr. Blume, Mannesmann AG, Duesseldorf;
- Dr. Boehm, Fraunhofer Institute of Systems Engineering and Innovation Research, Karlsruhe;
- Mr. Buecker, Fraunhofer Institute of Production Technology, Aachen;
- Mr. Drinkuth, Metal Workers' Union, Frankfurt;
- Dr. Brekner, Hoechst AG, Frankfurt;
- Professor Fleischer, TU of Berlin;
- Dr. Haepp, Daimler-Benz AG, Stuttgart;
- Mr. Hartung, Fraunhofer Institute of Production Technology, Aachen;
- Dr. Kador, Secretary of Federal Confederation of German Employers' Associations, Cologne;
- Professor Kloepffer, Society for Consulting and Analysis on Environmental Matters, Frankfurt;
- Mr. Lange, Fraunhofer Institute of Material Management and Logistics, Dortmund;
- Dr. Netze, Institute of Plastics Processing, RWTH, Aachen;
- Dr. von Roepenack, BDI [Federation of German Engineers or Confederation of German Industry], Cologne;
- Dr. Steinhilper, Fraunhofer Institute of Production Engineering and Automation, Stuttgart, and
- Dr. Weller, Digital Equipment, Munich.

Working Party 5—Production in a Rapidly Changing World

Chairman: Mr. Hartmann, Fraunhofer Institute of Production Engineering and Automation, Stuttgart

Members:

- Mr. Bauer, Fraunhofer Institute of Ergonomics and Organization, Stuttgart;
- Mr. Heinen, Seppelfricke Bros., Gelsenkirchen;
- Mr. Hess, Gesamtmetall Employers' Association, Cologne;
- Mr. Hopf, Mercedes Benz AG, Stuttgart;
- Dr. Jaberg, KSB AG, Frankental;
- Mr. Klingel, Trumpf GmbH & Co., Ditzingen;
- Mr. Kruegel, Metal Workers' Union, Frankfurt;
- Mr. Moszyk, Fraunhofer Institute of Material Management and Logistics, Dortmund;
- Messrs. Nuettgens and Gelb, Institute of Industrial Computer Science, Saarbruecken;
- Mr. Schanz, Institute of Theoretical Physics and Synergetics, University of Stuttgart;
- Dr. Schill, Asea Brown Bowen AG, Mannheim;
- Dr. Scmicker, CIM-TTZ [Computer-Integrated Manufacturing Technology Transfer Center], University of Magdeburg;
- Dr. Schmidt, Dynamit Nobel, Weissenburg;
- Mr. Scholl, Department of Controlling, University of Stuttgart;
- Mr. Schweizer, Siemens AG, Munich;
- Professor Specht, Department of Production Management, TU of Cottbus;
- Professor Tischendorf, Chemnitz Technology Center, and
- Dr. Westenberger, Bayer AG, Leverkusen.

Industrial Panel on Production Engineering Research Strategy

Chairman: Dr. Haepp, Daimler-Benz AG, Stuttgart

Members:

- Dr. Barth, KUKA Welding Works and Rober GmbH, Augsburg;
- Dr. Bartl, Heidelberg Printing Presses, Wiesloch;
- Dr. De Paoli, Robert Bosch GmbH, Stuttgart;
- Dr. Haepp, Daimler-Benz, Stuttgart;
- Mr. Kirschenheufer, Trumpf GmbH & Co., Hettingen;
- Mr. Klinkner, Porsche AG, Stuttgart;
- Dr. Kosmas, BMW AG, Munich;
- Dr. Koster, Trumpf Laser Engineering, Ditzingen;
- Mr. Matthes, Adam Opel AG, Ruesselsheim;
- Dr. Mueller, Mannesmann, Duesseldorf;
- Mr. Roelke, Siemens AG, Munich;
- Mr. Ubly, Heidelberg Printing Presses, Wiesloch;
- Dr. Voigt, Krupp AG, Essen;
- Professor Weissner, Wolkswagen AG, Wolfsburg, and
- Mr. Worresck, Adam Opel AG, Ruesselsheim.

VDW [Association of German Machine Tool Manufacturers] Working Party on Open Control Systems

Chairman: Dr. Schaefer, Association of German Machine Tool Manufacturers, Frankfurt

Members:

- Dr. Binder, Bosch GmbH, Erbach;
- Mr. Blum, Metal Workers' Union, Frankfurt;
- Mr. Butz, Heller GmbH, Nuertingen;
- Mr. Esslinger, Homag AG, Schopfloch;
- Dr. Grobel, Institute of Ergonomics and Industrial Organization, Karlsruhe;
- Mr. Hagemann, Association of German Machine Tool Manufacturers, Frankfurt;
- Mr. Hess, Gesamtmetall Employers' Association, Cologne;
- Dr. Herrscher, Index Works, Esslingen;
- Messrs. Junghans and Daniel, Institute of Machine Tool and Manufacturing Facility Control Engineering, Stuttgart;
- Dr. Kalis, Kloeckner Ferromatik DESMA, Malterdingen;
- Messrs. Schuetzenauer and Buehler, Mercedes-Benz AG, Stuttgart;
- Professor Schwab, European Plastics Institute, Luedenscheid;
- Dr. Walker, Hueller Hille GmbH, Ludwigsburg, and
- Messrs. Wucherer and Hoffman, Siemens AG, Erlangen.

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III. Production-Oriented BMFT Measures Already Under Way

The BMFT is spending an approximate total of 285 million German marks [DM] (about DM290 million in 1995) on current measures devised specifically to promote innovation in production. These measures are as follows:

1. Quality Assurance Program

The BMFT's Quality Assurance program sets out to disseminate know-how and to foster joint action, the exchange of information, and discussion with a view to enabling and encouraging firms to speed up the introduction of integrated quality assurance systems so that they will be able to withstand international competition, small and medium-sized businesses being the main target group. The following measures are currently under way:

- Basic research, in particular the German Research Association's priority "Innovative Quality Assurance in Production" program, plus the establishment of interdiciplinary and supraregional research teams to work on selected basic quality assurance topics;
- Joint projects, e.g., methods for introducing quality assurance systems (DIN/ISO [German Standardization Institute/International Organization for Standardization] 9000 ff), quality-enhancing organizational and management structures, information systems supporting corporate quality assurance, and quality and cost-efficiency;
- R&D on quality assurance interface standardization and measures to foster the broad-based conversion of quality know-how into practice.

2. Manufacturing Engineering Program

The BMFT is using its current Manufacturing Engineering program measures to support the faster development and application of computer-integrated manufacturing (CIM) in the new federal laender.

CIM sets out to link together all the sectors of a business that have a bearing on manufacturing. This strategy is designed to optimize the manufacturing process in its entirety with a view to reducing costs and throughput times while at the same time raising productivity, quality, and flexibility.

In order to provide businesses with opportunities to find out about the advantages offered by CIM and the various configurations and solutions available in a practice-oriented environment, the BMFT has launched a broad-based CIM technology transfer process, funding CIM technology transfer centers at the universities and colleges of technology in Berlin, Chemnitz, Dresden, Magdeburg, Suhl, and Wismar.

Over 400 manufacturing engineering equipment suppliers from the new federal laender are also receiving funding directly from the BMFT to carry out development work with a view to introducing computer-integrated manufacturing.

3. Work and Technology Funding Program

The main purpose of the Work and Technology program is to support research and development contributing to:

- health protection by eliminating or safeguarding against hazardous discharges and
- the humanization of work and technology.

Funds are thus being provided for the following research and development projects under the program on "Components for the Creation of New Strategies for Work, Production, and the Provision of Services":

- structuring of work and technology in new forms of innovative work organization (attractive production work, production strategies tailored to the workplace, working in groups);
- configuration of tasks and technology for "tomorrow's workstation" (flexible division of work between man and machine, computerized production processes, integration of learning and manufacturing), and
- strategies/procedures for planning and structuring innovation processes.

Priority topics include:

- tailoring machine tool designs and control systems for machining workpieces presenting complicated geometries for operation by skilled workers;
- strategies for integrating learning (training) into manufacturing work;
- aspects of workplace-programming of industrial robots;
- the reintegration of maintenance work into production;
- technical support for outlying organizational structures (profit centers, group- and teamwork) in the form of control station and information systems, and
- the devising of innovative forms of work for departments not directly involved in manufacturing via, for example, planning islands and the user-friendly configuration of computerized multimedia systems for corporate use.

4. Surface and Coating Technologies Funding Program

This funding program covers research into technologies used to produce, modify, and characterize function-performing surfaces and coatings. It sets out to create the conditions in which the potential of surface and coating technologies can be exploited in industry, and in particular by small and medium-sized enterprises, thus helping maintain and enhance competitiveness.

Funding is granted to R&D projects that build on specific potential applications, using system sets to overcome scientific and technical deficiencies that are currently hindering or preventing the spread of surface and

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coating technologies in industry: problems such as 3-D coating, lowering coating temperature, and process control and regulation.

The funding program is also supporting measures designed to remedy the current lack of information, such as the setting up of databases, the creation of information exchanges, and keeping standardization abreast of development.

5. Laser 2000 Funding Strategy

The leading projects in the "Precision Processing With Lasers" section of the BMFT's Laser 2000 Funding Strategy are focusing on laser process acceptance testing, laser-induced manufacturing processes, UV [ultraviolet] photon technology, and basic principles for laser-assisted production strategies. Research work is being funded on topics including short-time laser processes, microstructuring and surface modification, laser-assisted processes for rapid prototyping, laser-assisted process chains, and sensor- assisted laser processing to enhance precision.

Laser-optical measuring and testing procedures for production and environmental testing to replace obsolete mechanical and/or electronic measuring methods in production engineering, analysis, and environmental testing are to the fore in the funding strategy section on "Basic Principles for Opening Up New Fields of Application." The prerequisites for on-line manufacturing, process monitoring, and process control are also being created.

6. Production-Integrated Environment Protection Funding Strategy

The BMFT intends its Production-Integrated Environment Protection funding strategy to promote the development of industrial production in the direction of the "integrated" avoidance of discharges, the cyclic economy, and resource conservation. Points of departure for production-integrated environment protection, which must comprise product generation, product use, and product disposal in their entirety, include:

- environment- and resource-conserving extraction of raw materials;
- modification of process technology, replacement of polluting substances, closure of process cycles;
- environment-compatible product design for environment- conserving use, maintenance, and recycling;
- maximum recycling of residues into high-quality secondary materials, and
- restitution of nonrecyclable residues to the biosphere following pretreatment to render them innocuous to the environment.

The avoidance of discharges is accorded priority for funding purposes, the main focus being on non- or not readily degradable pollutants whose quantities or toxicity constitute a particularly serious problem for the environment. A system appropriate for research into substance flows, the factors affecting them, and the links between them, and for comparative assessments of various developments from the environmental point of view has not yet been fully developed.

7. New Materials for Key Technologies for the 21st Century

Future BMFT funding measures on new materials for applications in key technologies primarily concern information technology and transport, medical, and production engineering applications. These fields of application require the targeted refinement of new materials with their specific property profiles, followed by testing in components in actual operating conditions.

Production-relevant development targets in materials research include the following:

- raising the resistance (damage tolerance and service life) of materials for production engineering (e.g., tools, machine parts) to, as a rule, cyclical mechanical, chemical, tribological, and thermal stresses, and
- taking account of economic, ecological, and ergonomic aspects in all material developments.

8. Microsystems Engineering 1994-1999 Funding Program

Microsystems production engineering will have a higher profile than before in the Microsystems Engineering 1994-1999 funding program. Its industrial engineering, plant and equipment engineering, and manufacturing process aspects are of crucial importance to the cost-efficient conversion of existing microsystem prototypes and laboratory models into standard and series products.

The specific features of microsystems make this manufacturing technique fundamentally different from known manufacturing processes, although it still bears a certain similarity to conventional precision and semiconductor engineering. The complexity of microsystems means that an integrated view must be taken, comprising design, simulation, mounting and wiring, future use, and quality assurance. It is not enough, even now, to devise functions from the technological point of view: The requisite processes must also be concatenated in such a way that the microsystems can also be manufactured economically.

Once again, great store is set by joint microsystems projects making it possible for industry to build on the basic and applied research thus funded to develop marketable products.

9. Improvement of Production Engineering in Shipbuilding

The competitiveness of the nautical industry—and the shipyards in particular—must be raised by, among other things, exploiting the available potential for advances in productivity to the full. Production costs currently exceed those of major competitors by 10-35 percent.

Methods must be developed to speed up the process of building and outfitting ships. The ITiS (Information Technology in Shipbuilding) joint project, which has been under way since 1992, sets out to exploit the considerable potential for raising productivity in this area by integrating all subprocesses (design, engineering, operations scheduling, and manufacturing) within a communications and information

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technology system. The latest cutting and welding systems (e.g., laser welding), which reduce the refinishing operations necessitated by welding distortion, have the potential to cut the steel structure costs of a ship by up to 25 percent. Further basic work is still required to achieve technological advances arising out of systematic precision manufacturing, particularly in the preassembly and section manufacturing stages (e.g., CIM control stands).

IV. Initial Priority Measures

The surveys on "Strategies for Production in the 21st Century" identified a number of tasks of long-term significance for national competitiveness, on which immediate work was required. The BMFT has taken these proposals up and—in the light of an assessment by specialists representing industry, science, and the trade unions—will shortly be funding definition phases for the following 11 initial priority measures:

1. German Firms' Strategies for the Future in an Increasingly Rapidly Changing World: Prospects and Approaches

The idea is to improve German industry's strategies for the future against the background of an increasingly rapidly changing business world. Experience, problems, and know-how and concepts derived from industrial practice and various scientific disciplines will be brought together and pooled in a joint brainstorming and consultation process.

2. Joint Networking Models for Small and Medium-Sized Enterprise [SME] Structures

This project sets out to analyze the framework conditions in which SME's operate and to devise measures for raising German competitiveness.

To this end, alternative joint action models will be developed and tried out in the following areas:

- employees/training;
- information/organization;
- production technology, and
- products/materials.

3. Cyclic Economy—Recycling of Nonreusable Products Made of Combinations of Materials by Automated Dismantling and Sorting Systems

The brief is to develop an automated identification, dismantling, sorting, and recycling system for nonreusable products made of combinations of materials whereby the materials can be recycled economically. The project comprises defining the material cycles concerned, adapting and integrating existing components and laboratory models to form a fully automated dismantling and recycling line, defining requirements in terms of logistic organization, and studying the economic framework conditions.

4. Systematic Selection Criteria for Composite Materials Taking Account of Ecological Requirements

A strategy paper providing guidelines for composite material researchers and their industrial counterparts with a view to avoiding ecologically unsound developments is to be drawn up by five subprojects.

Work on the following subprojects will be closely interrelated:

- drafting of criteria and methods for assessing the ecological aspects of composite materials that can be treated cyclically;
- identification of potential function-dependent material combinations;
- identification of processing potential for composite materials;
- research into individual processes occurring during the life cycle of composite materials with particular reference to the identification, separation, and regeneration steps, and
- research into correlations between tool [as published] combinations and recycling paths.

5. Dynamic Production and Organizational Structures in a Fast- Moving Market

The project sets out to devise and test methods and procedures for creating and applying dynamic structures and aids for operating and directing decentralized, largely autonomous corporate units in various branches of industry in a transparent manner. The requisite instruments and tools will be refined, incorporating existing facilities. The following benefits may be expected:

- systematic client-orientation of all corporate employees and business processes;
- reduction in coordination and control expenses;
- delegation of responsibility and authority, and
- involvement of employees in planning, decision-making, and implementation processes.

6. Integrated Product/Process Models

The goal is to develop a tool allowing an overall view of planning processes and guaranteeing the derivation of an optimized process scene with:

- higher efficiency;
- improved quality;
- shorter throughput times;
- process reliability, and
- a clearer overview of functionality (activities, processes), quality (faults, throughput time), costs (personnel, material costs), and other interrelated factors (information links).

7. Quasi-Finished [endnah] Casting Taking the Crankshaft as an Example

The project sets out to improve and introduce quasi-finished casting technology by considering the overall process chain from the technological, economic, and sociological points of view and taking the manufacture of a crankshaft as an example. The risk of failure requires that the project be subdivided into a basic project to demonstrate practical and economic viability and an application project to introduce the new process chain.

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8. Method for Producing Complex Broadband Communications Assemblies Using Housed Micro- and Optoelectronic Components and Multichip Modules

Taking a broadband communications assembly presenting a wide variety of conventional and novel components as an example, this project will point up unsolved problems encountered in series mounting, wiring, and testing processes and devise ways of overcoming them. The solutions devised will be developed into production processes that can be used to exploit the advantages of combinations of future assemblies in the short term.

9. Dry Processing

The project sets out to devise a dry processing technology for the major materials used in mechanical and aeronautical engineering, bearing the processing of rotationally symmetrical and prismatic geometries in mind. The intention is to meet the basic manufacturing technology prerequisites for achieving a major advance in complete processing on machine tools without cooling lubricants, which represent a health hazard and are difficult to dispose of, in conditions of economic viability.

10. Method for Fabricating Passive Optical Components

Passive optical components stand out for their technical properties (low attenuation, defined division ratios [Teilungsverhaeltnisse]), compactness, good environment-compatibility, and low series production prices, and constitute a major factor in establishing optical data transmission in polymer fiber networks. The prerequisites for modern series fabrication are to be developed building on laboratory-scale component production, which is already feasible.

11. Development of Universally Compatible Modules for User-Oriented Open Control Architecture Operation

In order to guarantee the central functions of open machine control systems, various subfunctions, such as the user interface, diagnosis, maintenance, and servicing operations, organizational functions, system module creation, basic services, the incorporation of available tool management and monitoring programs, and software development will be standardized.

Further information on these priority measures may be obtained from: BMFT Project Manager for Production Engineering and Quality Assurance, Karlsruhe Nuclear Research Center GmbH, P.O. Box 36 40, D-76021 Karlsruhe, tel. 07247/82-

Germany: BMFT Funds Laser Testing, Counseling Centers

MI2408141894 Bonn TECHNOLOGIE-NACHRICHTEN MANAGEMENT-INFORMATIONEN in German 30 Jun 94 pp 8-9

[Text]

1. The "Laser 2000" subsidy priority program of the BMFT [Federal Ministry of Research and Technology] provides for testing and counseling centers. This separate subsidy initiative, directed at SME's [small- and medium-sized companies], aims to disseminate information about laser application opportunities. The necessary requirements for improving or supporting preliminary and initial technical counseling are to be created at selected, regionally balanced locations. To differentiate between depths of counseling, centers that are different in terms of expertise and structure (craft civision ste example) are also to be assisted.

2. The goals of the testing and counseling centers are:

- Familiarizing SME's in particular with the laser beam as a tool and the many options for its use;
- Testing novel applications in collaboration with medium-sized companies;
- Providing t. aining capacity for specialist laser staff on laser systems, taking account of differing qualification requirements;
- Demonstrating customary processing systems and stations for rapid development of customized operating processes;
- Arranging joint ventures between industry and laser centers;
- Providing training, counseling, and demonstration material for transfer tasks.

3. The subsidy measure aims to assist testing and counseling centers so that, together with existing resources, they can improve and, where necessary, increase the advice they offer. The criteria for choice are:

- Hurk degree of user competence in both laser-supported and comparative methods;
- Special target-group orientation (e.g., craft);
- Balanced regional distribution.

Software production may be part of the project only where essential for trial and counseling purposes.

The testing and counseling centers will be developed within an interchangeable network. Synergy effects, such as formulation of quality assurance measures or strategies according to ISO [International Organization Standardization] 9000, or development of qualification documents or feasibility tests, are possible here. The initiative is to be integrated by an evaluation report, in which the applicants undertake to cooperate. They also state their willingness to collaborate closely with private consultants, since competitive distortion is to be avoided.

4. Industry-related research facilities, chambers of trade and industry (CTI), chambers of crafts (CC), and research institutions are called to participate actively and/or informally. Particular consideration will be given to proposals where specific ideas already exist for collaboration with companies or institutions. Where possible, existing training and counseling systems should be included. In particular, it is pointed out that the basic technical equipment necessary for operation as a testing and counseling center should already be available.

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5. The BMFT will fund the testing and counseling centers according to technical rate confusion criteria and the budgetary funds available according to project priority. Project funding rates are governed by Article 92 of the EEC Treaty in conjunction with the "Community Framework for Government Subsidies to R&D" from the Commisssion of the EU, and its administrative practice. Accordingly, the subsidy rate awarded to universities and comparable organizations charging on an expenditure basis may be up to 100 percent. That for industry projects may contribute up to 50 percent of their costs. For projects by CTI's and CC's, provision is made for 50 percent funding of staffing costs, plus an annual grant of 10,000 German marks maximum for non-staff costs.

For the time being (initially for awards until 28 February 1996), a 10 percent bonus can be granted for funding activities in the accession area. According to the EC framework conditions for government subsidies to SME's, an additional funding preference of 10 percent can be granted to companies employing a new organization. This is provided they achieve an annual sales figure of not more than ECU20 million or a balance sheet total of not more than ECU10 million, and are not more than 25 percent owned by a major company. An accumulation of both preferences up to a total of 15 percent maximum is possible.

The relevant BMFT ancillary provisions are taken as the basis. There is no legal right to funding. Subsidy initiatives already underway and research projects planned within other research not commenteded on or taken into account in financing decisions to avoid uneconomic parallel funding.

6. Proposals for establishing or improving a testing and counseling center tasked as above should initially be submitted only as brief project descriptions (three to five pages maximum, made up as follows: overall objective, partners involved, working objectives, conceptual formulation, work plan, timetable, and financing plan), which must be based on the subsidy principle, should be submitted to the prime contractor: VDI [Federation of German Engineers] Technology Center, Physical Technologies, Graf-Recke-Strasse 84, D-40239 Duesseldorf, Germany, by 9 September 1994.

The BMFT and the prime contractor will take expert guidance from a project advisory board in assessing the brief description.

7. Further information and documentation on funding in the area of "Testing and Counseling Centers," especially forms for brief project descriptions, can be obtained from the prime contractor, VDI Technology Center, contact: K.D. Nowitzki, tel.: 0211/6214-544/401, fax: 0211/6214-484.

France's CNRS Threatened by Budget Cuts

94WS0479A Hamburg DIE ZEIT in German 22 Jul 94 p 25

[Article by Ludwig Siegele: "France's Research Center": "How Our Neighboring Country Produces Nobel Prize Winners in a Centralized Manner"]

[Text] Francois Kourilsky can be satisfied. When the General Director of the Centre National de la Recherche Scientifique (CNRS) assumed his office in mid-1988, the scientific organization had just survived a general attack by its opponents. When the biologist Kourilsky was replaced in mid-July by the physicist Guy Aubert, he commented justifiably, "The customary debate regarding the dissolution of the CNRS is no longer on the agenda of the day."

The largest scientific organization in Europe will consequently be retained by France until further notice. There is scarcely a researcher without CNRS experience, scarcely a laboratory without CNRS money, scarcely an area without a CNRS program. The four letters are ever-present on the other side of the Rhine. To create something comparable in Germany, the Max-Planck Society, the German Research Association and the Fraunhofer Institute would have to merge.

Regarding the numbers, the CNRS is also a match for a smaller conglomerate. The French government pumped about 3.35 billion marks into this organization in the past year. It employees about 27,000 people. Of these, there are almost 12,000 scientists alone working in over 1,300 research facilities. "The CNRS plays the central role in French basic research," explains Kourilsky.

This is the function the CNRS was to have from the beginning when founded in 1939. However, it did not grow into this role until the sixties, supported by President Charles de Gaulle. The budget was tripled and the number of researchers doubled between 1959 and 1964 alone. "The CNRS breathed new life into French research," said Louis de Broglie in praise then. He is one of the pioneers of spectroscopy.

No wonder that the CNRS heads have been able to rejoice regularly about Nobel prize winners. There are a dozen in the meantime. For example, in 1966, physicist Alfred Kastler won for discovering the optical pump, or in 1991, his colleague Pierre-Gilles de Gennes won for his research regarding molecular states in liquid crystals. Between these two, there were the biologist Jean Dausset, the chemist Jean-Marie Lehn, and the economist Maurice Allais.

It is also no wonder that the CNRS has borne, for a long time and especially outside France, the image of an organization a la francaise. It was, according to the reproaches, concentrated in Paris and cut off to a large extent from reality, thus from the universities and industry. Criticism even surfaced in the centralized government of France in the eighties. A neo-Gaullist faction even wanted to break up the CNRS and incorporate the individual parts into the universities.

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Scarcely a laboratory without CNRS money, scarcely an area of knowledge without a CNRS program

The research center in Paris today stands like a fortress not least because of the reforms forcefully put into effect by Kourilsky, for example, regionalization. The CNRS now sends two of three new employees to the provinces. The result is that ten years ago, almost two thirds of the government researchers worked in the population center Paris. Now, it is only about one half. By 1999, not many more than one third should remain there.

Even the image of an ivory tower no longer fits. In the meantime, the CNRS has become tightly knit with the universities and works together with industry to an increasing degree. Of the over 1,300 research facilities of the CNRS, two thirds are located near colleges. The number of joint-venture contracts with companies grew tenfold in the eighties. A few laboratories received more money from the companies than from the government.

Kourilsky also sees size, variety, and a hierarchical structure as a great advantage, particularly when interdisciplinary research is involved. To play this trump card, he was not shy about tearing down the traditional barriers between the various technical areas—in part against the wishes of those involved—in the past years and to pick out a handful of "interdisciplinary research programs" for support.

The goal of these programs is to attack primarily current research problems on as broad a front as possible. "Environnement" (environment) is concerned with the effect of humans on ecosystems or handling environmental problems. "Pirmat" is working on new materials, superconductors or quasi-crystals, for example. "Cognisciences" is researching the operation of the brain and is attempting to improve the organization of CNRS research teams.

In spite of all the reforms, the scientific conglomerate can obviously not dispense with a certain amount of bureaucracy—primarily in the regular evaluation of research results. "There are too many filters between the scientists and the committees that decide funding," complains the physicist Max Costa. He is research director and head of the CNRS laboratory in the Paris suburb of Meudon. "The proper on-site sensors are lacking."

The flow of information is made more important because the forty sections of the CNRS national committee do not hesitate when in doubt to change research contracts or even eliminate them. The committees, filled only with scientists, evaluate each researcher every two years and every laboratory every four years. Until now, the evaluation criterion was primarily the quantity, and not the quality, of publications. In the past years, over 700 laboratories had to change, 100 of these even had to close.

Despite this, scarcely any of the French researchers questions the existence of the CNRS. To the contrary, in April, 1,200 of them signed a petition that defended the scientific organization against attacks. "Whoever fights for the CNRS today is fighting for research in France as a whole," is the opinion of Henri- Edouard Audier. He is a physicist at the Ecole Polytechnique and the organizer of the petition.

In the research community of France, the fear that the currently conservative government will charge them with bearing the major portion of the budget cuts again is large. This is the same situation as in 1986 when the right came to power in Paris. That the Minister of Science Francois Fillon has started a "National Consultation" did not have a very calming effect. This is a country-wide brainstorming session regarding research once again concerning the future of the CNRS.

French research can indeed hardly stand additional cuts. Even the socialist governments in past years have reduced funding to a large extent. Today, France spends only about 2.4 percent of the gross domestic product for research—as compared to about 2.8 percent in Germany and Japan. Also, a large portion of the French research funding goes to the numerous military programs.

When the government in France reduces research, this has a worse effect than in Germany. This is because research in industry, primarily in small businesses, is traditionally underdeveloped—a result of French centralization of science. "Research is directed to too great a degree toward large government programs from which primarily the conglomerates profit," has been the classic complaint of experts for years.

Following the clear protest of the researchers, Fillon backed down for the time being. "The ideological debate regarding the CNRS is dead," he assured in mid-April at the closing ceremony of his "National Consultation." After the violent demonstrations against reduction of the minimum wage for youths, Prime Minister Edouard Balladur cannot afford any trouble until the presidential elections in May 1995.

After the elections, the research debate in France may start up again. The direction it might take was indicated by Fillon in a report. What amazes him, according to the report, "is the lack of a strategic vision for national research." The government sets virtually no targets any more although they are absolutely necessary for "mobilization and cohesion." And with this motto, the shadow of de Gaulle fell over Europe's largest research organization once again.

Germany: BMFT Funds Product Innovation in New Laender

MI1409080094 Bonn TECHNOLOGIE-NACHRICHTEN MANAGEMENT-INFORMATIONEN in German 31 Jul 94 pp 4-5

[Text] The goal of the new BMFT [Federal Ministry of Research and Technology] subsidy program "Product Innovation", presented by Federal Research Minister Krueger on 28 July in Berlin, is to boost small- and medium-sized industries in the new German laender. At present, there is a clear upward trend in industry in both western and eastern Germany. Industrial production in the new laender rose by 8.5 percent in 1993. In the first

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few months of [illegible] industry were [illegible] year, the federal [illegible] positive signs [illegible] industrial research [illegible] situation remains difficult.

A survey on the [illegible] industry revealed that [illegible] able importance [illegible] companies, however, [illegible] on imitating their [illegible] share of eastern [illegible] of high technology [illegible] proves that [illegible] internationally with [illegible] important tasks [illegible]

The federal research [illegible] a special program [illegible] new laender.

This program will be [illegible] parties and mass [illegible] total of 150 million [illegible] made available for the [illegible]

The goal of the [illegible] new German laender [illegible] ment of new products [illegible] information [illegible] new materials. The [illegible] technological know-[illegible]

Half of the DM[illegible] directly under [illegible] other half will be [illegible] measures such [illegible] capital base, [illegible]

All the R&D [illegible] required for [illegible] take the form of [illegible] to a maximum [illegible] The funding quotas [illegible] medium-sized [illegible]

The federal [illegible] setting up efficient [illegible] effectively by the [illegible] federal government [illegible] for industrial research [illegible] since 1990. The [illegible] Federal Ministry for Trade and [illegible] million in 1994. The [illegible] for the new laender.

The BMFT's special measures to support industrial research should be mentioned in particular:

- founding technology centers [illegible]
- promoting the [illegible]
- contract research and [illegible]

All these measures have since been extended. The latest move is that the EU Commission has agreed to extend the period of application for TOU measure to the end of 1995.

Altogether, the BMFT is supporting the creation of efficient industrial research by way of the various measures, and is thereby creating or maintaining about 4,200 jobs in industry in the new laender. According to surveys, about 80 percent of the 2,700 or so companies engaged in R&D in the new laender are affected by the federal government's measures to support industrial research.

The draft budget for 1995, which is 2.7 percent up on the budget for 1994, is a good starting point for the further development of industrial research in eastern Germany.

Additional information on the "Product Innovation" program can be obtained from: VDI/VDE Technologiezentrum, Informationstechnik GmbH, Potsdamerstrasse 12, 14513 Teltow, Tel. 03328/435-0, Fax 03328/435-141

Germany: Daimler Benz, DASA, DLR Agree on Cooperative Research

M12508102994 Luxembourg LUXEMBURGER WORT in German 17 Aug 94 p 13

[Unattributed DPA report:"Daimler Benz, DASA, and DLR Research Together"]

[Text] The German aviation and aerospace industry and corresponding state-subsidized research institutions want to collaborate more closely in the future. According to a press release, Daimler Benz AG (Stuttgart), Deutsche Aerospace (DASA, Munich), and the German Aerospace Research Institute (DLR, Cologne) have now concluded an agreement to this effect.

Under the terms of the agreement, research and development objectives in the technologies of the future are to be pursued by the parties working in unison. The agreement is trumpeted as "striving for a fundamentally new form of collaboration within the framework of a coordination and cooperation initiative."

Long-term, comprehensive research and development objectives for so-called "pacemaking technologies" are to be pinned down in central concepts. The extent of the necessary research and advance development work will be pre-determined. It was agreed that the new cooperation would start out based on concepts taken from the field of adaptive control electronics (adaptronics), automation, and robot development. Decisions on a further 10 undertakings will be made by the fall.

Among other things, these undertakings concern the development of the technological bases for a new kind of jet wing which will not only be electronically controlled, but also include new materials that are capable of reacting automatically—and hence "intelligently." The

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background to this development is the aviation industry's attempt to develop an environmentally friendly "eco- Jumbo" which uses considerably less fuel and thereby takes some strain off the environment.

The second concept agreed on so far is the next generation of robot for use in space travel. This undertaking is to be closely bound into both the German and the European space flight projects, while at the same time contributing to new areas of application for robots in the industrial and medical technology sectors. As the press release points out, by concentrating together on selected technologies of the future which boast a potentially broad range of applications, the partners anticipate a decisive increase in the speed of innovation, which is in turn expected to effectively enhance competitiveness. Attempts will now be made to extend the cooperation to include further industrial enterprises and research institutes.

German Report on State Support for Information Technology Issued

94P60358A Duesseldorf HANDELSBLATT in German 19/20 Aug 94 p 6

[Article entitled: "State Aid in the Billions"]

[Text] The expansion of information technology in Germany is supported annually by the Federal Government, the laender and the European Community with a total of 1.6 billion German marks [DM]. The information technology market has an annual turnover of DM130 billion. This information is contained in the "1994 Information Technology Research Report," which the Federal Ministry for Research presented on 17 August in Bonn.

Information processing by microchips is essential for the development of the information society, according to the report. Preparatory work in research and development, as well as the joint efforts of the state and industry, will lead to investments in billions of marks in the coming years. One expression of this is the decision to expand in Dresden the largest semiconductor plant in Europe, but also the extension of the research infrastructure by enlarging the Institute for Silicon Technology in Itzehoe. This report provides an interim view of the "Promotion Plan for Information Technology 1993-1996." One result is the so-called "Microelectronic Consensus Round" which groups semiconductor companies and representatives from the corresponding industrial associations. Thus, for example, a joint project to develop a chip technology of the future ("smart fabrication") is being planned.

The Ministry for Research insists that information technology must be driven mainly by initiatives from business and industry. The state should be limited to providing model solutions by the aid of pilot projects, according to the report.

Germany: Rexrodt Advises Research Concentrate on New Growth Markets

AU0609085994 Duesseldorf HANDELSBLATT in German 5 Sep 94 p 6

["cmk"-attributed report: "Rexrodt Complains About Research Concentrating on Traditional Fields"]

[Excerpt]If Germany wants to be able to compete internationally, innovations must not only concentrate on the development of new products, but also on production methods and organizational structures, Economics Minister Guenter Rexrodt said in conclusion of a summer college in Berlin organized by the HANDELSBLATT publishing group.

In the necessary dialogue between state, industry, and science, the state must provide the framework conditions allowing creative thinking. Its role should not be limited to finding billions of marks in research funds. In this connection, he also warned companies not to rely too heavily on subsidies and public programs. Innovation is first of all a matter of companies themselves. With research amounting to 2.6 percent of the GNP, Germany is among the world leaders.

Rexrodt complained that, in spite of a very good basis, German research concentrates too much on traditional technologies and is showing too low a profile in the future growth markets, such as new materials, information technology, and biochemistry. What is needed in Germany and in Europe is the quick transferring of scientific findings into marketable products and processes. Sometimes he gets the impression that there is a Chinese Wall separating research labs from production sites, Rexrodt said. [passage omitted]

Italy: Thin Film Activities of R&D Center Discussed

MI1409074594 Rome NOTIZIE AIRI in Italian Jul-Aug 94 pp 17-18

[Interview with CETEV Consortium President Dr. Carlo Misiano by NOTIZIE AIRI, date and place not given]

[Text]

[AIRI] President, could you briefly explain to us what the acitivities of the center are?

[Misiano] CETEV [expansion not provided] is a consortium that is 90 percent controlled by Officine Galileo (formerly part of the EFIM [Manufacturing Industry Holding and Financial Company] group) and 10 percent by Alenia. Following the liquidation of EFIM, Officine Gallileo are now passing under the control of Finmeccanica. When the transfer will be completed, the center will be 100 percent controlled by the Finmeccanica group.

CETEV's R&D activities focus on thin film technologies. We are working on two topics in particular: the first concerns thin films for optics and the second involves

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treatment processes for plastic packaging. In this last sector we are trying to develop a product that, in addition to being resistant to water vapor and oxygen while maintaining its transparency and lack of color, also leads to improved plastic recycling. Moreover, the first research topic concerns an important sector such as the ophthalmic sector and plastic lenses in particular.

Our annual budget is around 3-4 billion lire a year. Funding for the most important research projects comes from MURST [Ministry for Universities and Scientific and Technological Research] under Law No. 64. Other funding comes from European projects and associated companies.

[AIRI] Do you have contacts with small and medium-sized industries? If so, do you encounter problems?

[Misiano] We generally have contacts with large-scale companies such as Alenia Spazio, Enichem, or the Istituto Donegani; but we also highly value having contacts with small and medium-sized companies. We promoted the establishment of various small companies around our center which help us increase our related activities. The center has a staff of 14 (11 of which are researchers), six scholarship holders, while related activities involve 26 people overall.

We have never encountered difficulties in relations with small and medium-sized industries since they possess an authentic business mentality with a great interest in the industrial applications of research. We ourselves are convinced that if technological research does not respect the projected schedules and costs to reach the production phase, it is only a waste of money.

[AIRI] Do you perform joint research, that is research commissioned by associated companies?

[Misiano] We have still to perform joint research but hope this will take place because only in this way we reach the critical mass that is necessary for small and medium-sized companies. In the world of high technology, research calls for investments that are rarely at the reach of small and medium-sized companies: joint research is certainly a means of overcoming this type of obstacle. Last month we organized an international conference that was designed to create a European association whose goal would be research targeted toward the needs of industry, especially small and medium-sized enterprises.

[AIRI] What about your contacts with universities and research institutes?

[Misiano] We have excellent and solid contacts with universities. These are the universities of Palermo, Catania, Bari, L'Aquila, Rome 1 and 2, Modena, Pavia, Turin, and Padua. We also have intense collaboration accords with the CNR [National Research Council] centers and with ENEA [National Agency for New Technolgies, Energy, and the Environment].

Italy: Industries Reduce R&D Expenditure

MI1409075494 Milan IL SOLE-24 ORE in Italian 4 Sep 94 p 5

[Article by Vera Viola:"Research:Companies Halve Expenditure"]

[Excerpts] Research investments are crashing. Many large-scale and medium-sized Italian companies, which are feeling the pinch of the crisis, have changed their R&D plans. This trend began in the fall of 1992 when approximately 70 companies refused public aid, and continued throughout 1993-94.

This picture emerges from the funding requests submitted to the Applied Research Fund managed by IMI [Institute for Financing Real and Personal Property] (on the basis of Law 46/82). In 1993 and in the first half of this year, funding requests for "independent" projects, that is by companies, submitted to IMI were down 50 percent over preceding years: from an average of 200 funding requests totalling more than 2 trillion lire overall in preceding years, to 97 projects submitted for a value of 1.3 trillion lire in 1993. The same levels applied to the first half of 1994: 52 requests submitted for an overall value of 588 billion lire.

In more general terms, the entire activity of IMI has changed despite the availability of resources: In 1993 EUREKA [European Research Coordination Agency] projects remained paralyzed due to a lack of funds that had been used up in previous years. None of the 21 requests amounting to 211 billion lire were approved. The level of activity of national research programs also remained low, with a slowdown that had already been recorded in 1991: in 1993, 8 projects (106.4 billion lire) were stipulated compared to 16 (133 billion lire) in 1992.

To compensate, investments by small and medium-sized companies in research commissioned to external laboratories increased (141 applications submitted in 1993 for 28 billion lire, 65 requests in 1994). This is provided for under Article 4 of Law No. 46/82 and had been exploited very little in the past. In recent months, IMI has published a guide for small and medium-sized industries that is distributed by industrial associations and chambers of commerce to promote this type of funding.

Overall, however, IMI applied research expenditure totalled 590 billion lire last year (this is the value of resolutions made in 1993), very little if compared to the financial availablity of 2,202.6 billion lire most of which remained locked away. "The remaining funds," explained IMI Applied Research Director Giuseppe Colona, "are partly (800 bilion lire) for national research programs that are about to begin again, and partly (600 billion lire) for science parks in southern Italy." However these funds had been locked away for initiatives that should have been launched many years ago. In the case of science parks for the South for example, which were provided for under a 1991 program accord, the 13 best projects were selected only a few months ago. [passage omitted]

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But there are signs of a recovery on the horizon. As Giuseppe Colona says." Lately the number of companies calling us for information has multiplied. Moreover, simplified procedures that entered into effect in June should speed up funding times. All this makes us us hope there will be a comback in applied research."

France: High Council for Science & Technology Established

94P60368 Paris AFP SCIENCES in French 25 Aug 94 pp 1,2

[Unattributed article: France: Establishing the High Council for Science and Technology Information]

[Text] Establishing the High Council for Science and Technology Information—decided upon in January 1993—became effective on 25 August 1994, when a decree on its composition was published in "Journal Officiel".

This High Council, with the mission, according to its president, Minister for University Education and Research Mr. Francois Fillon, "to propose general orientations" to be developed in science and technology information matters, will have twenty three members (1).

Ten regular members:

- Director General of Cultural, Science and Technology Relations in the Foreign Affairs Ministry;
- Director General of Education and Technology in the Ministry of Agriculture and Fishing;
- Director of General Delegation of Armament Technology Research and Studies Office in Defense Ministry;
- Director of Science and Technology Information Office and Libraries in University Education and Research Ministry;
- Director General of Administration and Development Offices in Environment Ministry;
- Director General of Industrial Strategies Office in Industry, Post, Telecommunications and Foreign Trade Ministry;
- Director General of Post and Telecommunications Office in Industry, Post, Telecommunication and Foreign Trade Ministry;
- Director General of Health Office in Welfare, Health and City Ministry;
- Director of New Information and Technologies Office in National Education Ministry;
- Director of Science and Sensitive Transfers General Office in Ministry of Nation Defense.

Two personalities nominated out of Science Academy members, proposed by the academy's permanent secretary:

- The President of the City's Science and Industry Administration Council;
- The President of The Libraries' High Council;
- Nine industrial, technology world personalities, nominated upon join proposals made by ministers in charge of Industry and Research;

Personalities coming from without the administration are nominated by decision of the Prime Minister for a possible two-term three year period. Vacated positions, are to be filled by new members designated for the left over period, to end with the predecessor's term. In this case, the positions could be held only for one three year term.

According to the Ministry of Education and Research, nominations will be announced in the coming weeks.

Other than that, the same decree has announced the composition of a science and technology information coordinating committee which, apart of the president, will consist of five members designated by the ministries of University Education, Foreign Affairs, Defense and Industry, respectively, ten representatives of public organizations and eight personalities with expertise in science and technology information field.

(1) See AFP Science no. 910 p. 1 27 Jan 1994.

CORPORATE ALLIANCES

Germany: DASA May Take Stake in Israeli Aeronautics, Defense Firms

BR1409133694 Paris AIR AND COSMOS INTERNATIONAL in French 2 Sep 94 p 12

[Unattributed report: "Daimler Benz Looks to Israel"]

[Text] The German group Daimler Benz and its DASA subsidiary will be examining the possibility of taking a stake in Israeli aeronautics and defense companies that are currently being privatized. These companies include avionics company Rada and even the state-owned firms Rafael and IAI. Behind this interest in Israel is the hope that El Al will buy some Fokker and Airbus planes. Until now the Israeli state airline has remained a faithful customer of Boeing.

CORPORATE STRATEGIES

Germany: Eurocopter Hopes for UK Order

MI2508080794 Berlin DIE WELT in German 26 Jul 94 p 11

[Article by Peter Schmalz:"Demonstration Flight for a Billion Mark Order: Eurocopter Wants To Build New Army Helicopter for London:Competition From USA"]

[Text] A decisive battle is currently under way in the European skies, and the winner will be able to take home a trophy worth over 7 billion German Marks [DM]. The favorite is the new German-French combat helicopter "Tiger" by Eurocopter that is facing its first crucial test. Its fiercest rivals come from the United States: the "Cobra Venom" by Bell and the "AH64 Apache" by McDonnell-Douglas.

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The combat site is Great Britain: London is seeking a new combat helicopter for the next century. An order of 120 was planned, but necessary belt tightening has reduced the number to 90. The sales volume was limited to 3 billion pounds (DM7.5 billion).

The competitors were recently invited to Middle Wallop, the base of the British Army Air Corps, for a flight demonstration. A decision is expected for next year. Outsiders are the "Comache" by Sikorsky/Boeing which has not yet had its maiden flight and will hardly be available by 1998, the introduction year desired by the British, as well as the Italian "A129" by Agusta.

South Africa surprisingly entered the competition at the last moment: The "Rooivalk" by Denel Atlas Aviation is hardly given a chance, but it might cost the winner dearly.

Which helicopter can best support the kingdom in its defense tasks at the beginning of the 21st century will be up to the military to decide. What type of helicopter is finally purchased is an economic and political question of major importance for London.

The favorable side effects of the "Tiger" are pointed out mainly in the Eurocopter center in Paris: Should Britain opt for the German-French model, British Aerospace could become a member of Eurocopter and thus share in the successes expected from numerous new developments that will become ready for series production within the next few years.

Eurocopter is the largest civilian helicopter manufacturer in the world. If the British should enter, the head of the Italian government, Silvio Berlusconi, might like to let the deficit-ridden Agusta slip under the European helicopter roof as well. That would create a European consortium in the helicopter sector similar to the Airbus for civilian passenger planes. The battle is far from over.

France: Matra, Elf, BNP May Become Renault Shareholders

94WS0493A Paris LE MONDE in French
10 Aug 94 pp 1, 15

[Article by Eric Leser and Caroline Monnot: "Matra, Elf, and BNP Reportedly Will Become Renault Shareholders"]

[Text] *Although Suez eventually said no, Matra [General Company for Mechanical Engineering-Aviation-Traction] does intend to be one of the future shareholders in Renault, which the government intends to partially privatize. The BNP [National Bank of Paris], Elf Aquitaine, and other groups will reportedly also become shareholders in the former government corporation in order to constitute a "hard core" of shareholders. Renault's labor unions are still cautious in their attitude toward a denationalization which, on the other hand, appears to be attractive to institutional investors.*

Who should Renault's core shareholders be if, as is becoming increasingly probable, the automobile manufacturer is quickly privatized? As far as the government is concerned, that question will apparently have to be answered early this fall. It has been known for several days (LE MONDE, 7-8 August) that the authorities are very seriously considering the possibility of putting a good number of the former government corporation's shares up for sale. Renault, which is estimated to be worth 40-45 billion francs, will continue to have the state as its principal shareholder, since the preferred option calls for giving the government a 34 percent share (compared to its current 80 percent, the rest being owned by Volvo) rather than a 51 percent interest.

If that is indeed the option chosen and if, in accordance with the agreements signed at the start of this year, the Swedish company cooperates by giving up a minimum of 12 percent of its shares, 58 percent of Renault's shares will change hands. But even if the state decides, basically for political reasons, to retain its majority position (51 percent), 41 percent of Renault's shares will still be up for sale.

Technically, the privatization should take place by the classic method of offering shares in the former government corporation for sale to individuals, French and foreign institutional investors, and the firm's employees.

The chief difficulty is that it will be necessary to set up a "hard core"—that is, to provide Renault with a group of stable shareholders, and this will have to be done from scratch.

"Is it possible to quickly provide Renault with a hard core that will last?" asks someone familiar with the case. The reason for that question is that the timetable is rigidly set. Volvo's disinvestment clause expires on 30 November. "It is imperative to get the Swedish company out of there before the time is up" is the comment in government circles, because otherwise the privatization process will be even more complex. If Volvo retains its share, even temporarily, it will be the biggest member of the hard core. Renault and the authorities want no part of that. Hence the need to come up with other arrangements.

At the same time, the government is in a race against time. It has only a few weeks in which to identify potential shareholders, sound them out, and obtain confirmation of publicly expressed intentions. Among the manufacturing firms, Matra declared itself a candidate at the start of the year. Jean-Luc Lagardere's group [Matra] liked the idea of being the automobile manufacturer's reference shareholder. The two firms are cooperating successfully on so-called unit construction vehicles. After all, did Matra not invent the Espace, one of Renault's biggest commercial successes? Sources in the ministries explain: "Jean-Luc Lagardere's dream is certainly that of becoming a shareholder, but without spending a cent to do so; he wants to do it simply by turning his automobile activities over to Renault."

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When that proposal was tested with the authorities, it was rejected by the state in its capacity as a shareholder, because what it wants is cash. Jean-Luc Lagardere is said to have lost some of his enthusiasm since then. Explanation: "His firm's financial backers made some simple calculations. In the automobile industry at the best of times, the return on invested capital climbs to 2.5 percent. The arms industry yields a better return on one's investment. Shifting the Matra group's center of gravity to the automobile industry is likely to weaken the group's overall profitability."

A financial institution, Suez, was also approached. Flattered and tempted, the company on the rue d'Astorg in Paris finally declined the offer. On the grounds that it was incompatible with the institution's rules on the purchase of industrial shares. "Our policy is clear. We buy into industry only as the controlling shareholder and the reference shareholder with more than 20 percent of the capital. Our share of the stock must also be twice that of the second largest shareholder," Suez explains.

Renault does not meet those criteria, the firm emphasizes, and it wonders: "The state is keeping a minimum of 34 percent of the capital. It will continue to be the principal shareholder. Who can be sure that sometime in the near or distant future, it will not trade its interest for a new industrial alliance? That being the case, why should we put several billion francs on the table and run the risk of someday seeing someone other than ourselves become the reference shareholder?"

So then, a little Matra (but less than originally planned), a little BNP (Renault's traditional banker), and probably a little Elf Aquitaine—that may turn out to be the foundation of the future group of stable shareholders, if we are to believe certain government experts.

Favorable Reception From Investors

That takes care of the hard core. For its part, the sale of securities on the stock exchange seems to be posing fewer problems. In fact, that is Renault's basic trump card at the moment. The idea that the automobile manufacturer may be privatized is calling forth spontaneously good reactions in the market. Overall, the famous institutional investors who rule the stock exchange are very favorable to Renault. Only the Anglo-Saxons are somewhat reserved—as usual. Having been more or less burned by the forced privatization of the UAP [Paris Insurance Union] in April, the managers of trust funds and other funds much prefer industrial assets to financial assets such as the AGF [General Insurance Company of France].

What about the prospects for growth and profitability? They seem much better, or at least more certain, in industry! "Everybody wants Renault!" emphasizes Agnes Slazy, an analyst at the Pinatton stock brokerage firm. "The beneficial effects of the resumption of growth in an activity as sensitive to economic conditions as the automotive industry are relatively easy to grasp." She adds: "Renault's profits could reach 4.5 billion francs in 1995 and 7.9 billion francs in 1997."

As a result, operators in the stock market, who are far from satisfied with the performance of firms affected by the latest privatizations, are hoping "to finally get a good deal" with the automobile manufacturer. Renault has another, somewhat paradoxical, advantage: it is not quoted on the stock market at all except as regards its nonvoting shares, which do not show much activity. Renault has no past record on the stock exchange. No falling prices this year, no disappointments, and no base price. For all that, privatizing Renault will not be just a simple formality.

Preserving a strong state presence in Renault's capital is not considered an advantage, and neither is the symbolic and political dimension of the operation. There is even a rather clear difference in the way the matter is viewed by French and foreign institutional investors. In the opinion of one representative of a large American bank, "the state's presence in Renault's capital could be perceived both as a political maneuver to satisfy the opponents of privatization and as reflecting the difficulty involved in 'turning the page'." It could be a curb on investment decisions." That feeling is not shared by Gerard Ewenczyk, financial analyst at Safe [expansion not given]. "The state's presence in the firm's capital is the deciding factor when it comes to participation in the hard core, but not when it comes to an investment decision by an institutional investor."

"Privatizing Renault would be more sensible than trying to get rid of the AGF at all costs. But the window will be a narrow one in any case," is how Alain Spadone of the Private Banking Union in Geneva sums it up. He adds: "The Paris Stock Exchange is likely to feel the first effects of the presidential election campaign at the end of this year, and I fear the contagion from a slippage on Wall Street." One more constraint imposed by a timetable!

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